



*Presentation to the Public Service Commission of South Carolina*

## **Using Demand Response to Meet Peak Capacity Needs**

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*March 13, 2008*

# Summary

As a leading provider of Commercial and Industrial (C&I) Demand Response capacity to utilities across North America, EnerNOC respectfully requests that the Public Service Commission of South Carolina and utilities of South Carolina consider provisions to include Demand Response in pending peaking resource procurement requirements.

## Demand Response from Commercial & Industrial Customers

- A reliable and efficient way to help meet rising peak demand while reducing need to build additional infrastructure
- Leverages existing resources from an untapped class: Commercial and Industrial (C&I) customers
- A clean resource that contributes to state and utility environmental goals
- Incentive payments provide opportunities for local economic development
- Increasingly, a part of utilities' portfolio of programs to cost-effectively meet peak load growth

## The Opportunity for South Carolina

- South Carolina utilities are seeking and implementing solutions to meet rapidly rising peak demand
  - New peak load records
  - Drought could negatively impact reserve margins
  - New generation and power purchases in development
- C&I customers are available to provide large amounts of relief during peak hours: in 2006, **96%** of peak 100 hours overlapped with working hours
- Based on experience, up to **5-10%** of a system's peak demand can be met through Demand Response

# Agenda

- **EnerNOC Overview**
- Demand Response from Commercial & Industrial Customers
- Opportunity for Demand Response in South Carolina

# EnerNOC Overview

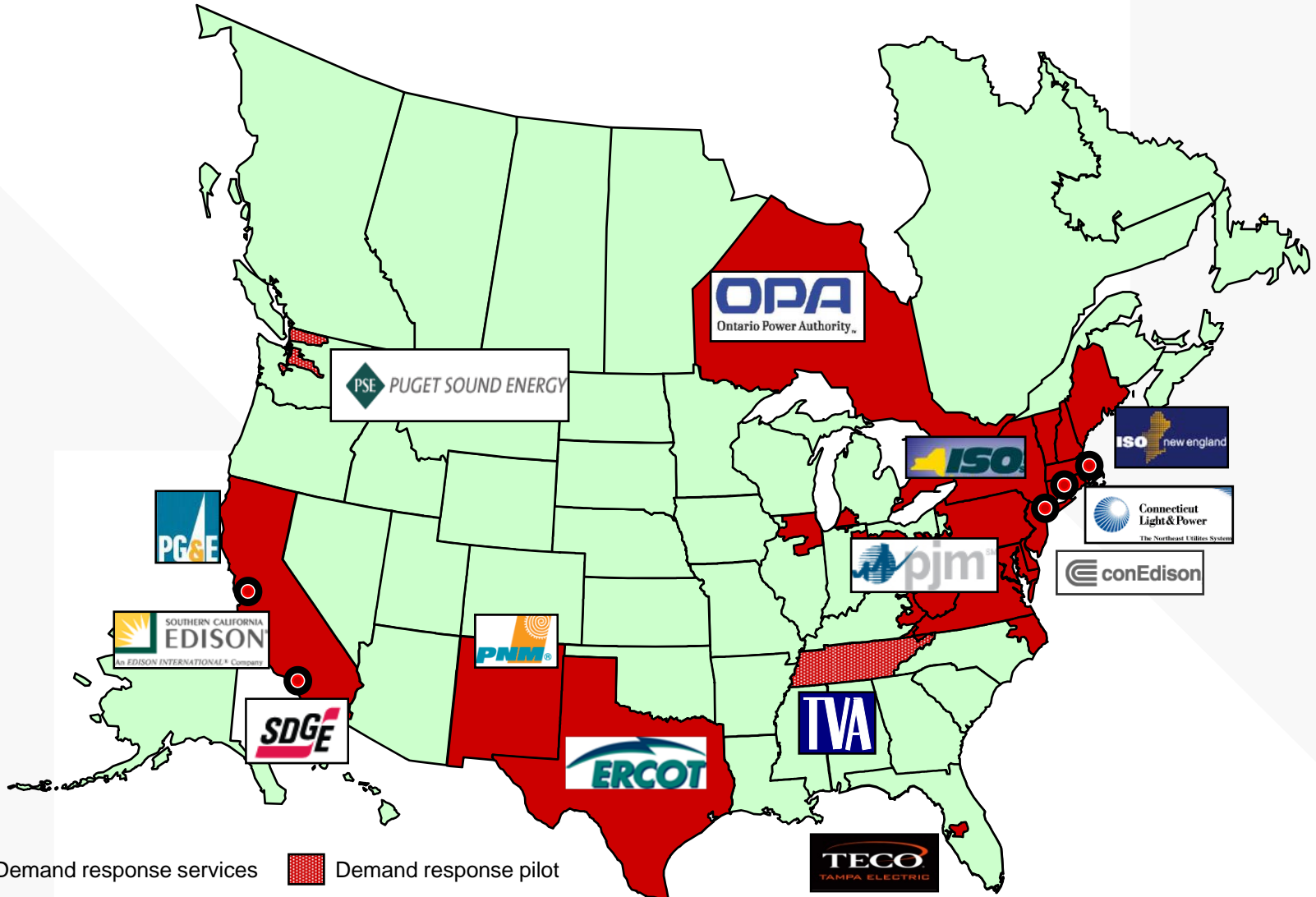
EnerNOC is the leading technology-enabled, Commercial & Industrial-focused demand response and total energy management solutions provider in North America.

- ***Proven and growing track record*** – 1,113 MW of reliable demand response capacity under management from 2,195 customer sites<sup>1</sup>; hundreds of demand response events deployed to date; guaranteed performance to our utility customers
- ***Compelling utility offering*** – Full service turnkey demand response solution – research, education, engineering, permitting, financing, metering, aggregation, enrollment, installation, reconciliation, maintenance – remove complexity and increase end-user participation
- ***Advanced technology*** – Provide 24/7/365, real-time metering and web-based monitoring and control through open architecture technology that provides near real-time visibility into performance and leverages customers existing assets
- ***NASDAQ IPO of ENOC May 18, 2007***
- ***Significant resources***
  - ***Human capital*** – Deep management team experience in energy and technology management; nearly 300 employees
  - ***Financial*** – Strong balance sheet and impressive financial track record

(1) As of December 31, 2007

# EnerNOC Overview

EnerNOC operates in every open demand response market, has bilateral contracts with utilities, and is continuously developing new markets by leveraging our experience.



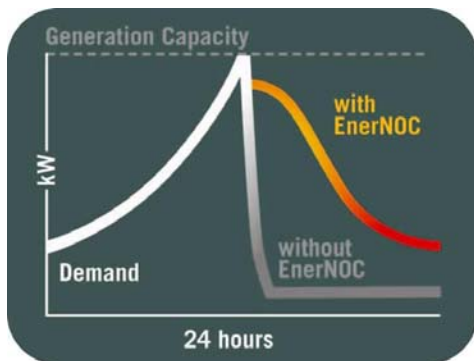
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- EnerNOC Overview
- **Demand Response from Commercial & Industrial Customers**
- Opportunity for Demand Response in South Carolina

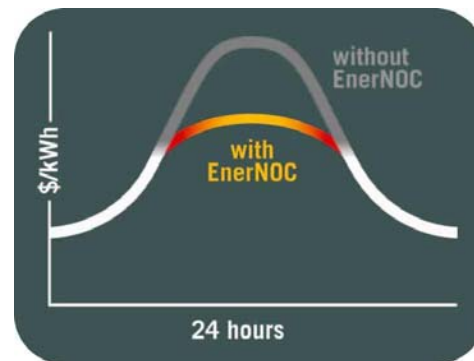
# What is Demand Response?

- A clean, reliable alternative to the construction and use of power plants:
  - From the perspective of the electrical grid, reduced demand is the same as added supply
  - Rather than turning on a power plant to meet peak demand, electricity consumption can be temporarily reduced so that existing supply is sufficient
- Participants receive payments and other benefits for their participation
- Demand response events are called by utilities to mitigate:

## System reliability events

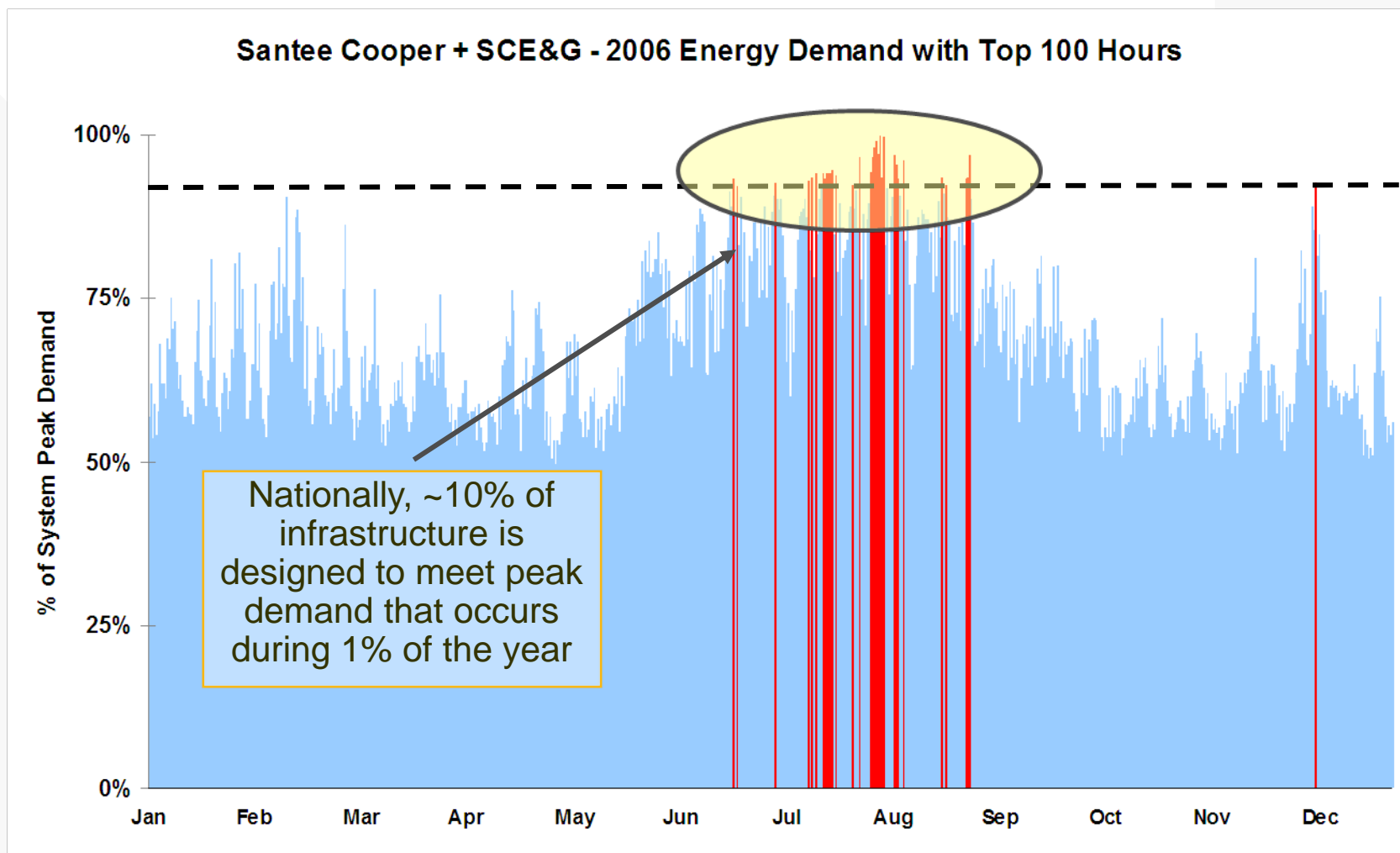


## High-cost peak power purchases



# Peak Demand in South Carolina

Peak demand occurs for very few hours each year; Demand Response is a cost-effective, reliable, and efficient way to meet these peak periods.



Source: EnerNOC analysis of 2006 data filed on FERC Form 714



# What is Demand Response?

Dispatchable load reduction programs can take different forms depending on customer segment and utility needs.

	Interruptible Tariff	Demand Response Program	Direct Load Control
<b>Customer Segment</b>	<ul style="list-style-type: none"> <li>Large Industrial</li> </ul>	<ul style="list-style-type: none"> <li>Light Industrial and Commercial</li> </ul>	<ul style="list-style-type: none"> <li>Residential</li> </ul>
<b>Resource Profile</b>	<ul style="list-style-type: none"> <li>Idiosyncratic loads that require customized curtailment plan or full shutdown</li> </ul>	<ul style="list-style-type: none"> <li>Idiosyncratic loads that typically require customized curtailment plan</li> </ul>	<ul style="list-style-type: none"> <li>Common applications (e.g. HVAC, water heaters) with utility automatic control</li> </ul>
<b>Customer Profile</b>	<ul style="list-style-type: none"> <li>Generally, more sophisticated energy users</li> </ul>	<ul style="list-style-type: none"> <li>Some energy sophistication, most require guidance</li> </ul>	<ul style="list-style-type: none"> <li>Little energy interest or sophistication</li> </ul>
<b>Curtable Load</b>	<ul style="list-style-type: none"> <li>1 MW and up</li> </ul>	<ul style="list-style-type: none"> <li>100 kW and up</li> </ul>	<ul style="list-style-type: none"> <li>1-2 kW</li> </ul>
<b>Incentive</b>	<ul style="list-style-type: none"> <li>Reduced electricity rates</li> </ul>	<ul style="list-style-type: none"> <li>Capacity and energy payments</li> </ul>	<ul style="list-style-type: none"> <li>Nominal credit or other incentive</li> </ul>
<b>Reliability</b>	<ul style="list-style-type: none"> <li>Reliability varies</li> </ul>	<ul style="list-style-type: none"> <li>Metering &amp; control tech. enables high reliability</li> </ul>	<ul style="list-style-type: none"> <li>Limited visibility into performance</li> </ul>
<b>South Carolina Example</b>	<ul style="list-style-type: none"> <li>SCE&amp;G Rider to Rates 23 and 24</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>Duke Energy Rider LC</li> </ul>

# How Does Demand Response Work?

Demand response actions come in two basic forms: curtailment and onsite generation.



**Curtailment** – Turning off lights, turning up cooling set-points, turning off air handlers, shifting production schedules, shutting down escalators, elevators, water features, parking lights, signage, heating elements, etc.



**Onsite Generation** – This can include emergency/backup generation, peaking and continuous-duty distributed generation, or even UPS systems.

# Case study: Tampa Electric Company

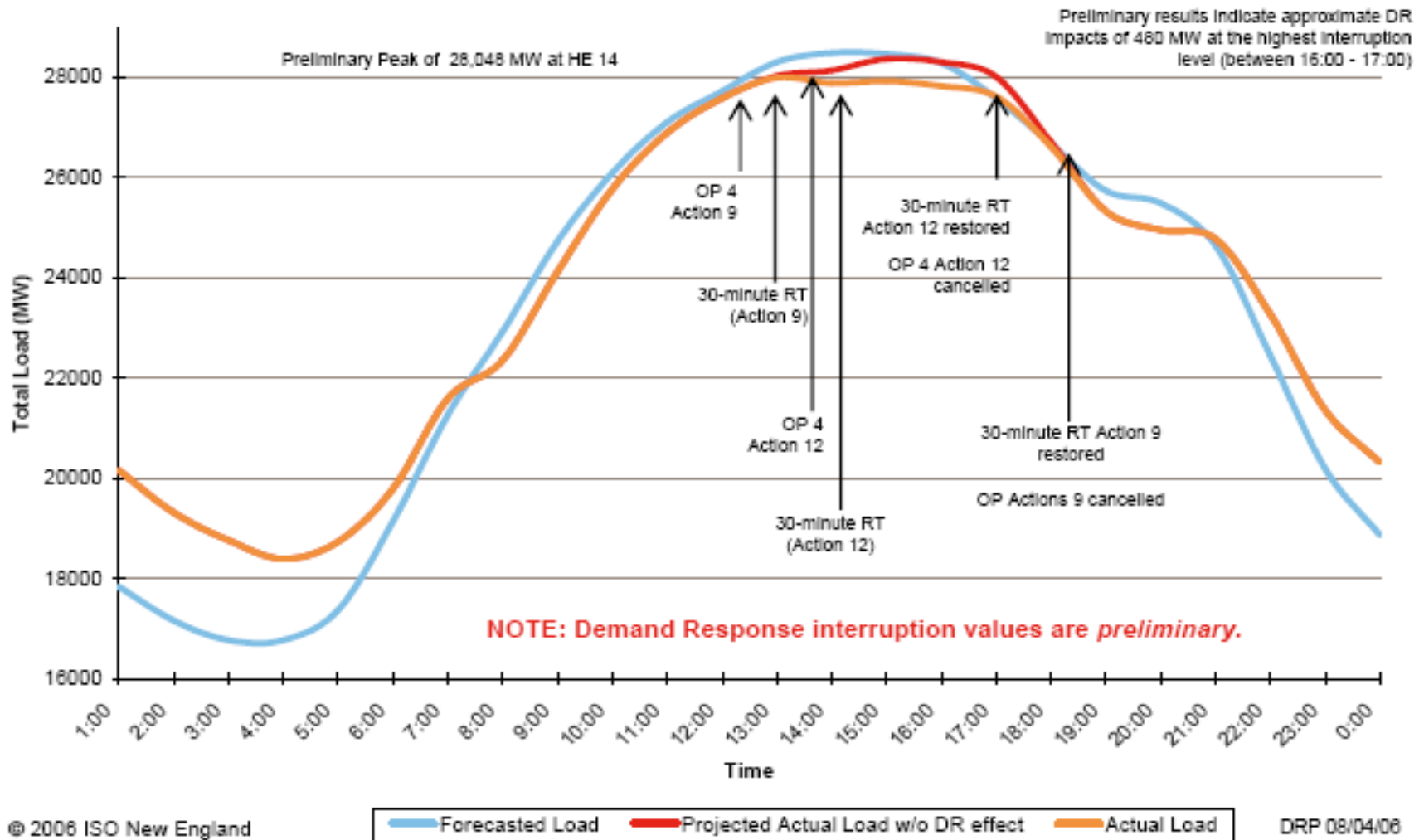


- New system peak on August 20, 2007: **4,352 MW** – growing peak demands in both summer and winter seasons
- TECO evaluated several potential demand providers; chose EnerNOC as implementation contractor
- EnerNOC helped design program parameters, and assisted TECO in obtaining regulatory approval – contract finalized August 31, 2007, and regulatory approval received September 25, 2007
- All marketing materials and program information have been branded as **TECO**, to enhance utility's relationship with Commercial and Industrial customers

Key Program Parameters	
Capacity	25 MW minimum
Contract Duration	4 year term starting June 2008
Program Window	Up to 8 hours per event; 7 AM to 7 PM non-holiday weekdays; year-round
Maximum Run Time	Up to 88 hours per year
Notification	30 Minutes
Payments	Monthly capacity payments (\$/MW-mo) plus energy payments for events (\$/MWh)

# Demand Response from the Grid's Perspective

## ISO New England Demand Response Performance, August 2, 2006



# Agenda

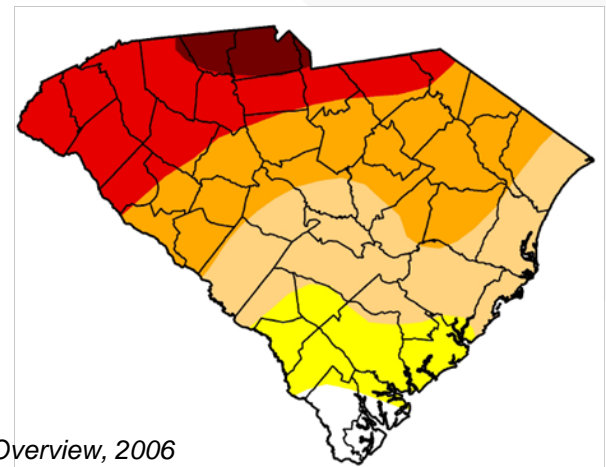
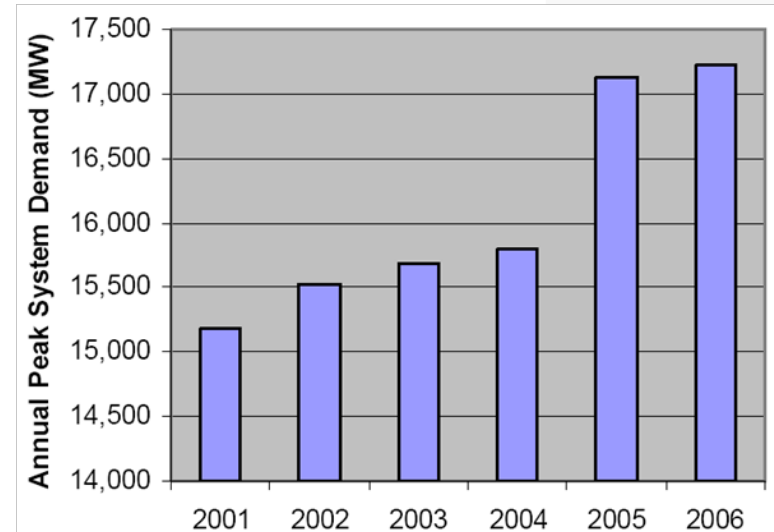
- EnerNOC Overview
- Demand Response from Commercial & Industrial Customers
- **Opportunity for Demand Response in South Carolina**

# Opportunity for Demand Response in South Carolina

Peak demand growth across the state is forcing utilities to consider their options

- Statewide peak demand topped 17,000 MW in 2005 and 2006<sup>1</sup>
- South Carolina utilities set new summer and winter peak records<sup>2</sup>
  - Santee Cooper:
    - 4 Jan 2008 **5,649 MW**
    - 10 Aug 2007 **5,563 MW**
  - SCE&G:
    - 8 Aug 2007 **4,869 MW**
    - 4 Jan 2008 **4,593 MW**
- Potential drought conditions<sup>3</sup> would negatively impact summer reserve margins
- New generating facilities and power purchase agreements are in process; now is the time to consider demand response

South Carolina annual peak system demand



(1) South Carolina Energy Office: S.C. Utility Demand-Side Management and System Overview, 2006

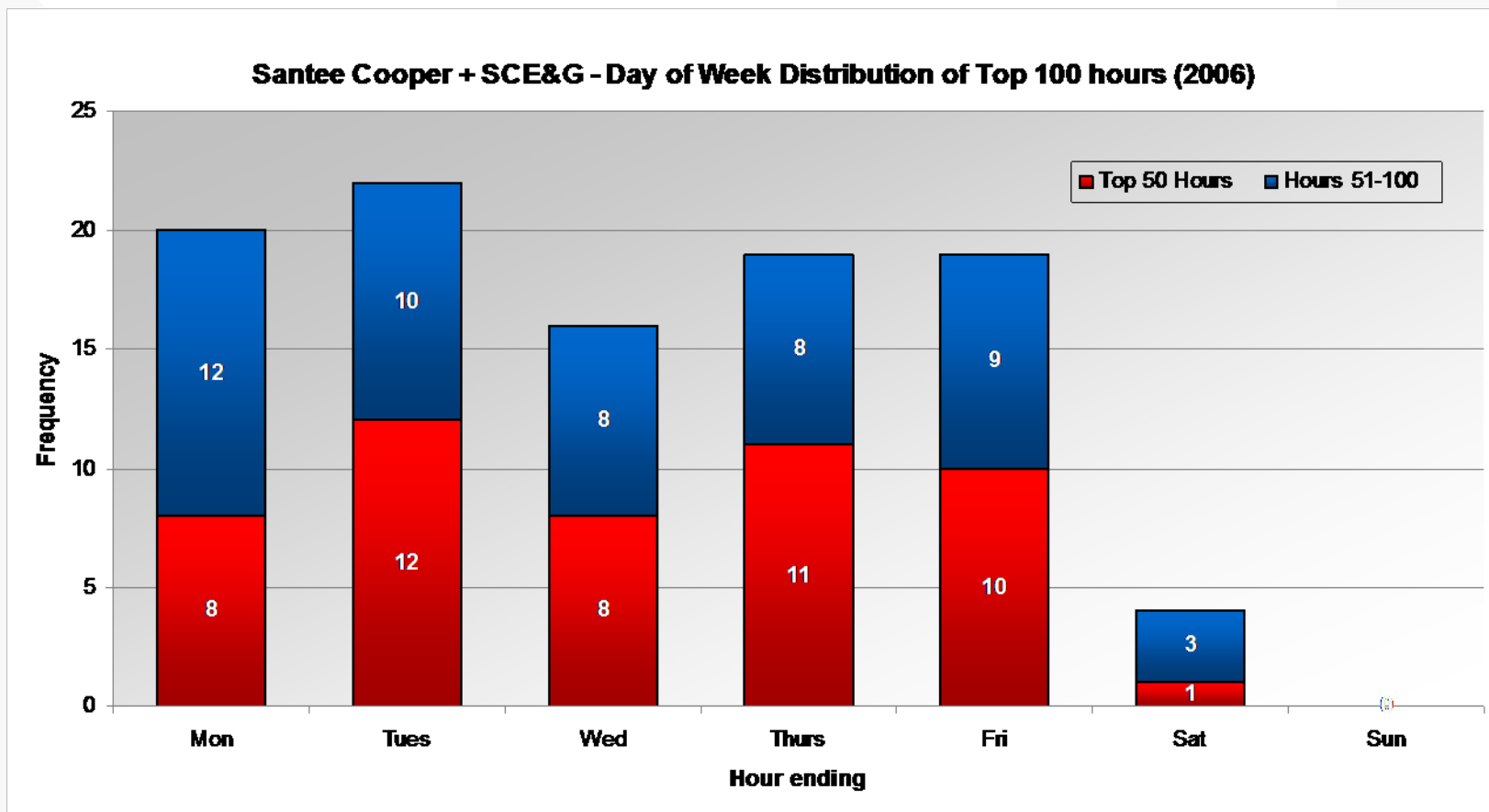
(2) Company press releases

(3) Map from U.S. Drought Monitor, South Carolina, 4 March 2008; <http://drought.unl.edu/dm>

# South Carolina Peak Demand Characteristics

Commercial and Industrial demand response providers are well suited to deliver needed capacity reductions during times of peak demand

- In 2006, 96% of the Top 100 hours on the combined Santee Cooper and SCE&G systems occurred **during working days**

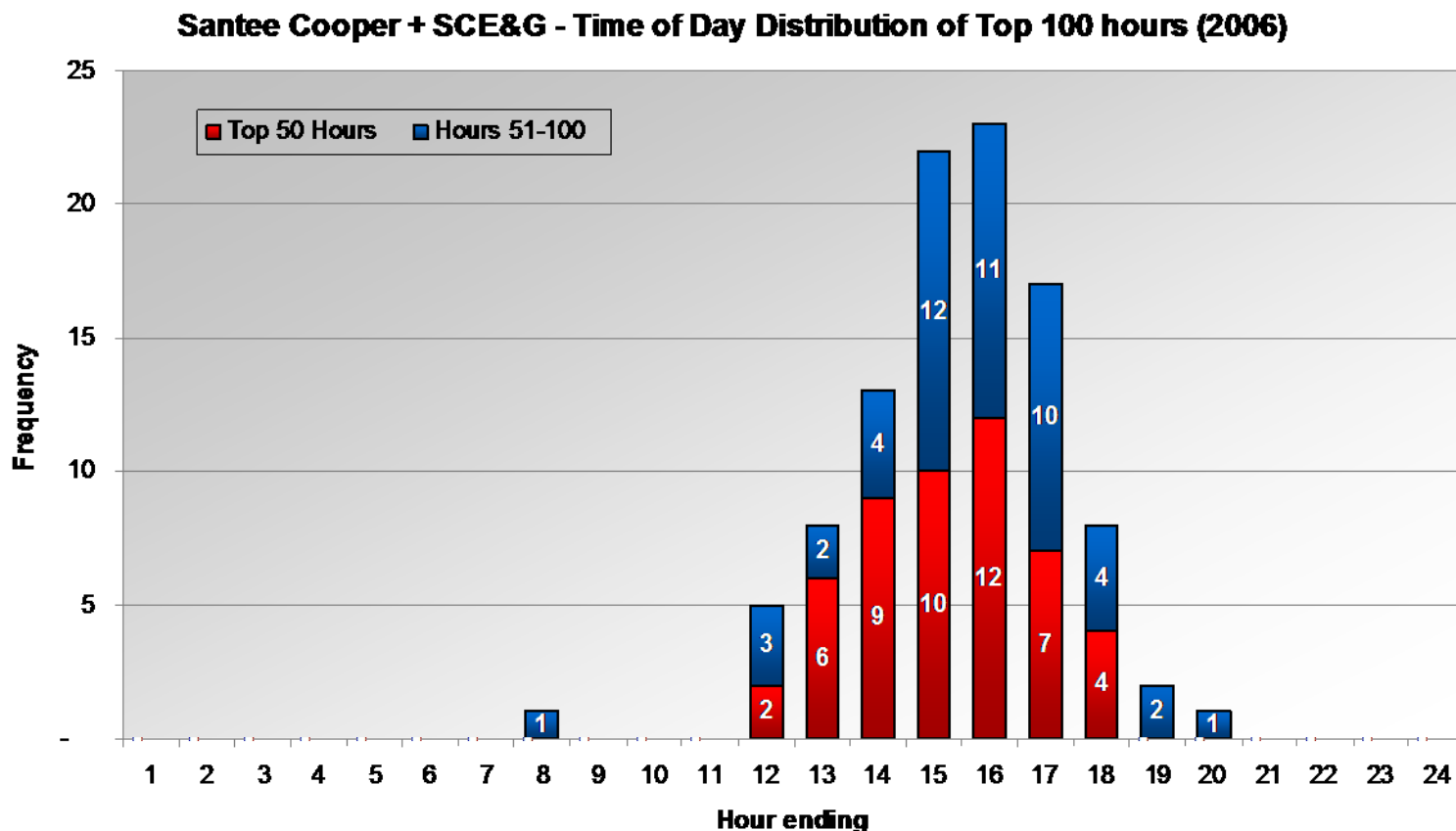


Source: EnerNOC analysis of 2006 data filed on FERC Form 714

# South Carolina Peak Demand Characteristics

Commercial and Industrial demand response providers are well suited to deliver needed capacity reductions during times of peak demand

- In 2006, over 96% of the Top 100 hours on the combined Santee Cooper and SCE&G systems occurred **during work hours** – midday to early evening



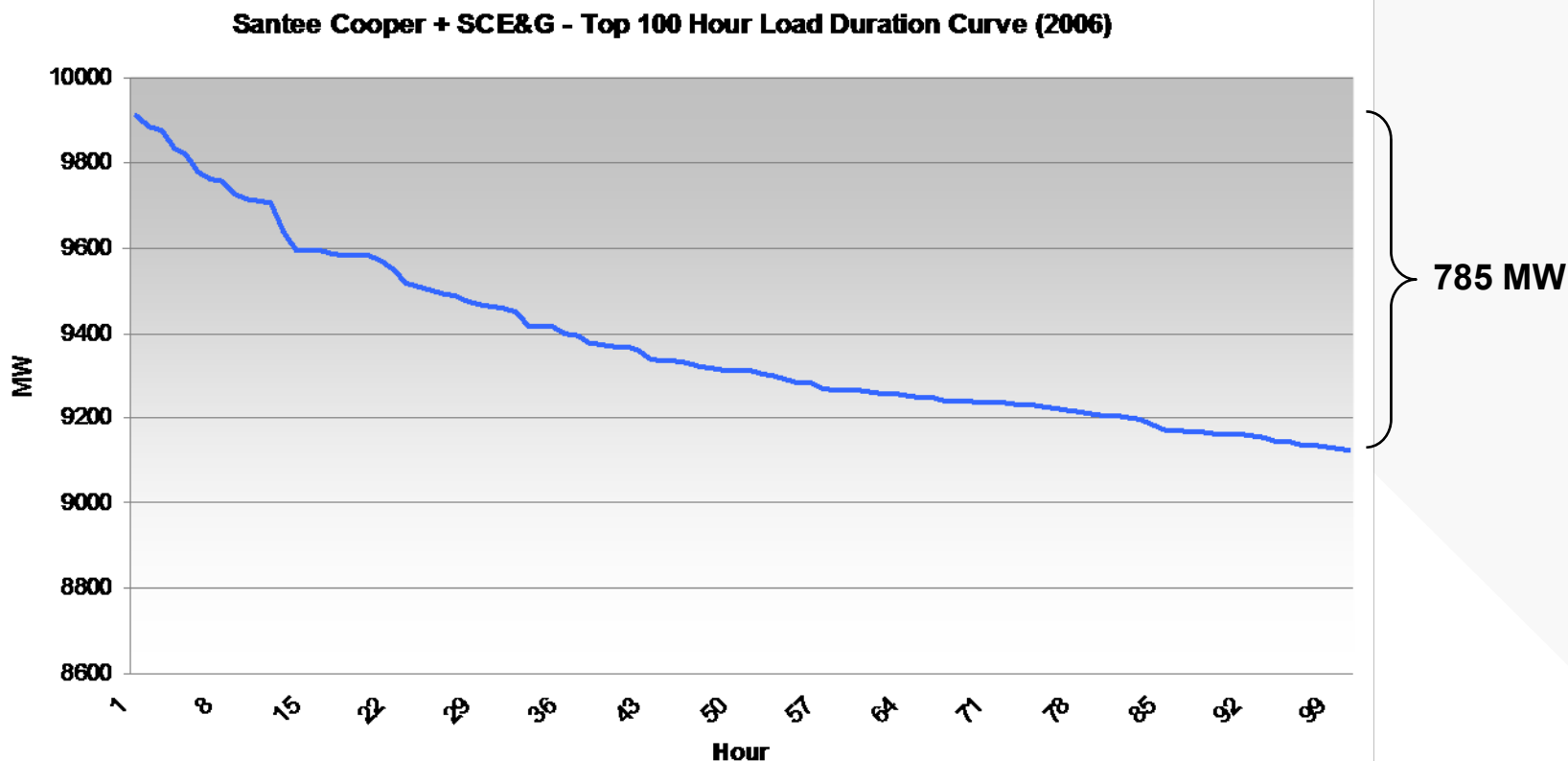
Source: EnerNOC analysis of 2006 data filed on FERC Form 714



# Peak Demand in South Carolina

Demand Response resources are likely sufficient to meet a significant portion of South Carolina's peak need

- Santee Cooper and SCE&G had a combined coincident peak of **9,910 MW** in 2006
- The Top 100 hours of demand accounted for **785 MW** (~8%) of this peak
- DR potential of 5% - 10% of system peak → **500 - 1,000 MW** (850 – 1,700 MW statewide)



Source: EnerNOC analysis of 2006 data filed on FERC Form 714

# Conclusions

## ***South Carolina's Situation***

- Peak electric demand growth is a critical issue for South Carolina's utilities; now is the time to ensure all potential solutions are receiving proper attention
- While a few dispatchable demand side programs exist in South Carolina to address peak periods, tens of thousands of Commercial & Industrial customers, who are well-positioned to deliver reliable capacity when needed, are excluded from providing benefit to the grid

## ***EnerNOC's Requested Solution***

- The Public Service Commission of South Carolina should consider provisions that encourage South Carolina utilities to employ Demand Response strategies



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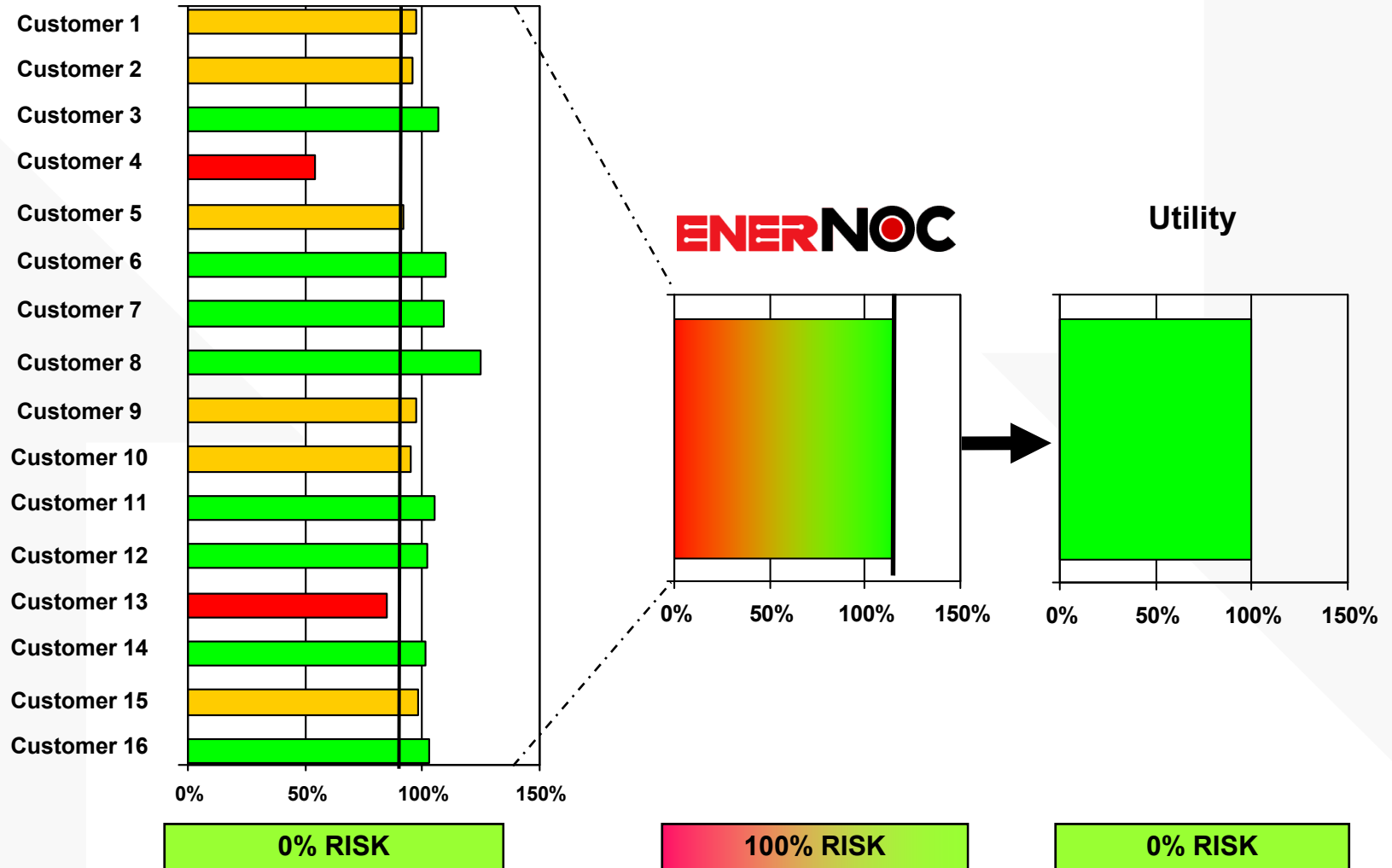
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## **Additional Information**

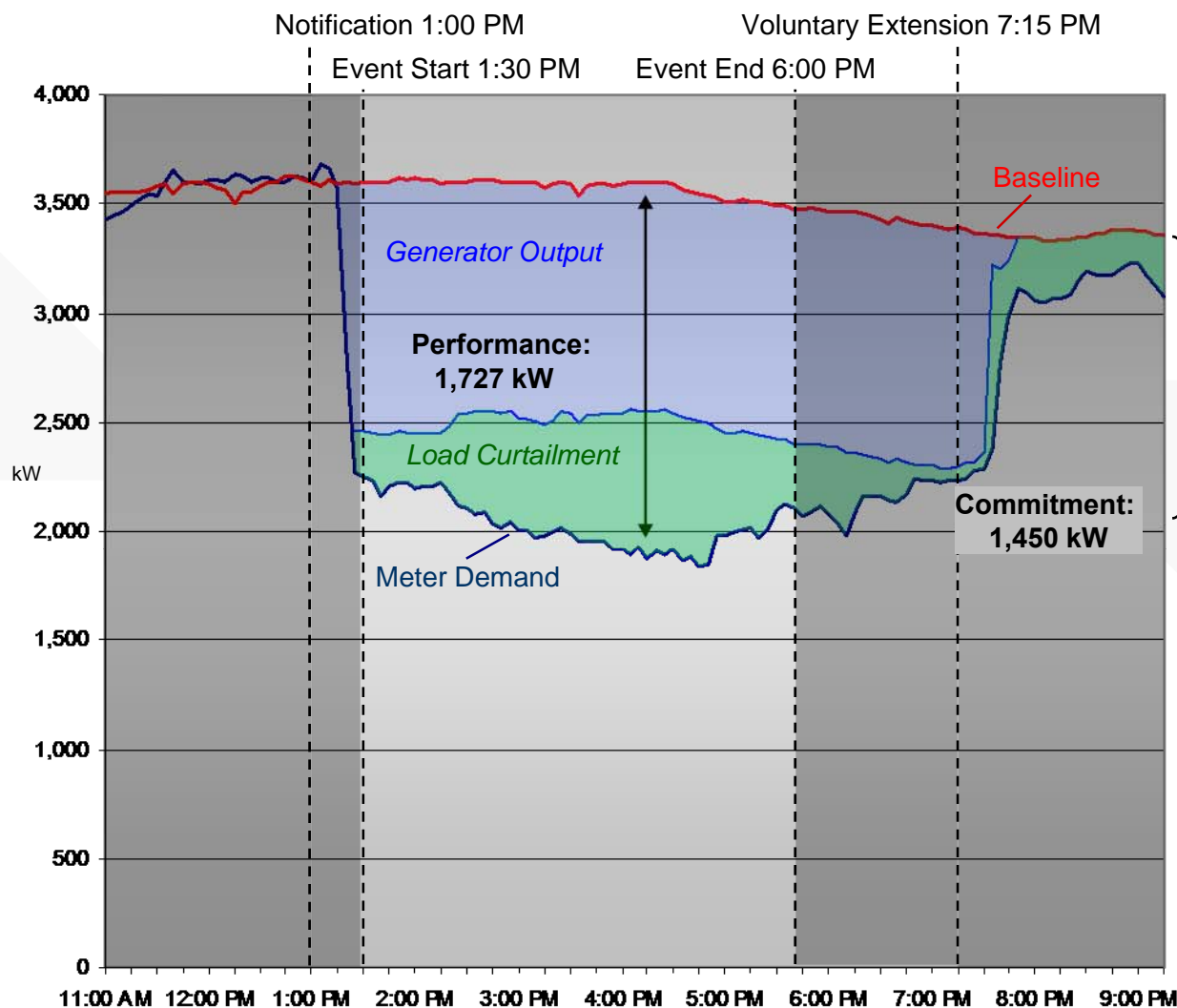
# EnerNOC Overview

Our portfolio approach to load aggregation provides risk management to utilities and end-use customers



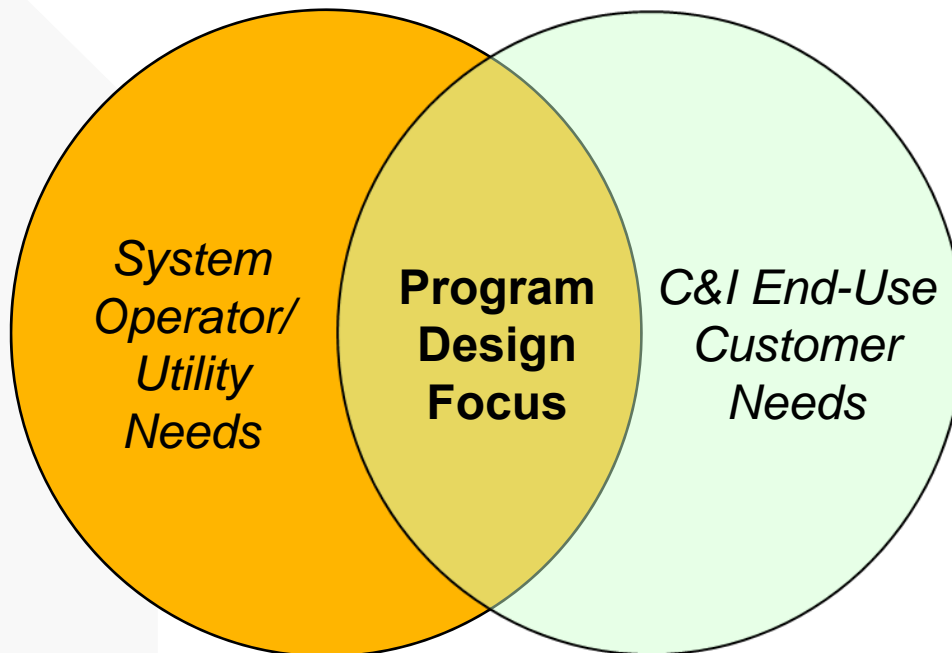
# Making Demand Response Work for Customers

University provider combines generation with load curtailment to reduce more than 1.7 MW from the electrical grid.



# Making Demand Response Work for Utilities

Effective DR programs are designed by first considering system needs and then determining how untapped customer resources can help meet those needs.



## Utility Requirements

- **Reliable capacity/service**
  - “If we can’t count on it, we don’t want it.”
- **Available capacity when and where needed**
  - “We most value capacity which is deployed quickly, in needed locations, available for peak.”
- **Significant capacity**
  - “If it isn’t going to make a difference it’s just a science project.”
- **Ease of use**
  - “We can’t reconfigure all our systems and control room for this.”
- **Ease of settlement**
  - “We don’t have resources for a lot of manual processes.”
- **Reasonable economics**
  - “We can only justify what it’s worth.”

# Comparing Demand Response Programs to Traditional Peaking Power Resources

## Advantages of DR

- DR capacity can be “built” very quickly (6 – 12 months)
- Capacity can be *precisely targeted* at areas of highest system need (for example, to defer distribution system upgrades)
- Load curtailment resources are *emissions-free*
- No “NIMBY” or “BANANA” siting issues
- Reliable (no “forced outage” risk)
- Long-term power purchase contracts are not required
- Performance tends to *increase* (as well as rated capacity) in conjunction with system peaks
- Reduces costs for customers and ratepayers; *improves customer satisfaction*

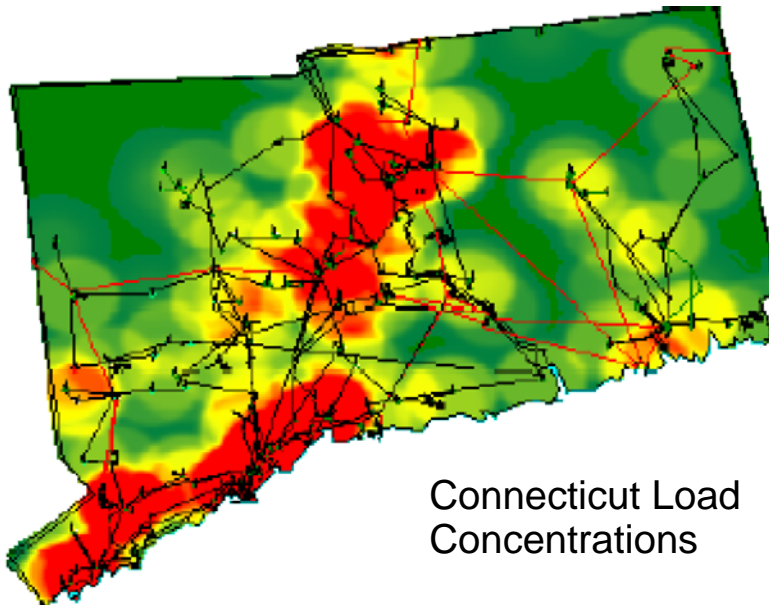
## Differences with DR

- Annual availability limits – typical program design targets most critical 50 to 100 hours per year
- Concentrated, frequent, and long-lasting events can lead to “customer fatigue”
- Depending on portfolio mix, performance may be limited during shoulder months and off-peak hours
- Output can vary within a range of “rated output” – typically +/-15%, due to variability of loads controlled and baseline calculation methodology
- Total capacity is limited to approximately 10% of overall system peak



# Demand Response from the Grid's Perspective

“Firm” demand response can have a material impact on system peak demand



Connecticut Load Concentrations

## Case Study: Connecticut

- ~7,400 MW peak
- **740 MW** of dispatchable (30-minute notice) demand response – **10%** of statewide peak

*“Today’s peak record would have been hundreds of megawatts higher if it were not for ISO New England’s demand response programs . . .”*

*ISO-NE, August 2, 2006*

Source: ISO-New England data as of February, 2008

# Demand Response Benefits Ratepayers

Demand Response has been shown to lower electricity costs for ratepayers in deregulated markets by reducing the need for expensive spot market purchases and deferring capacity additions

- **ISO-New England: *Electricity Costs White Paper* (2006)**

- Reducing electricity use by 5% during peak times will save consumers **\$580 million per year**

- **Brattle Group: *Quantifying Demand Response Benefits in PJM* (2007)**

- **\$138-281 Million of system benefits to PJM** if load curtailed 3% during top 20 5-hour price blocks of 2005

- **Summit Blue: *Demand Response Resources Valuation and Market Analysis* (2006)**

- Forecast: Demand response will save **\$892 million** in capacity charges over next 20 years (present value, 2004 \$)

